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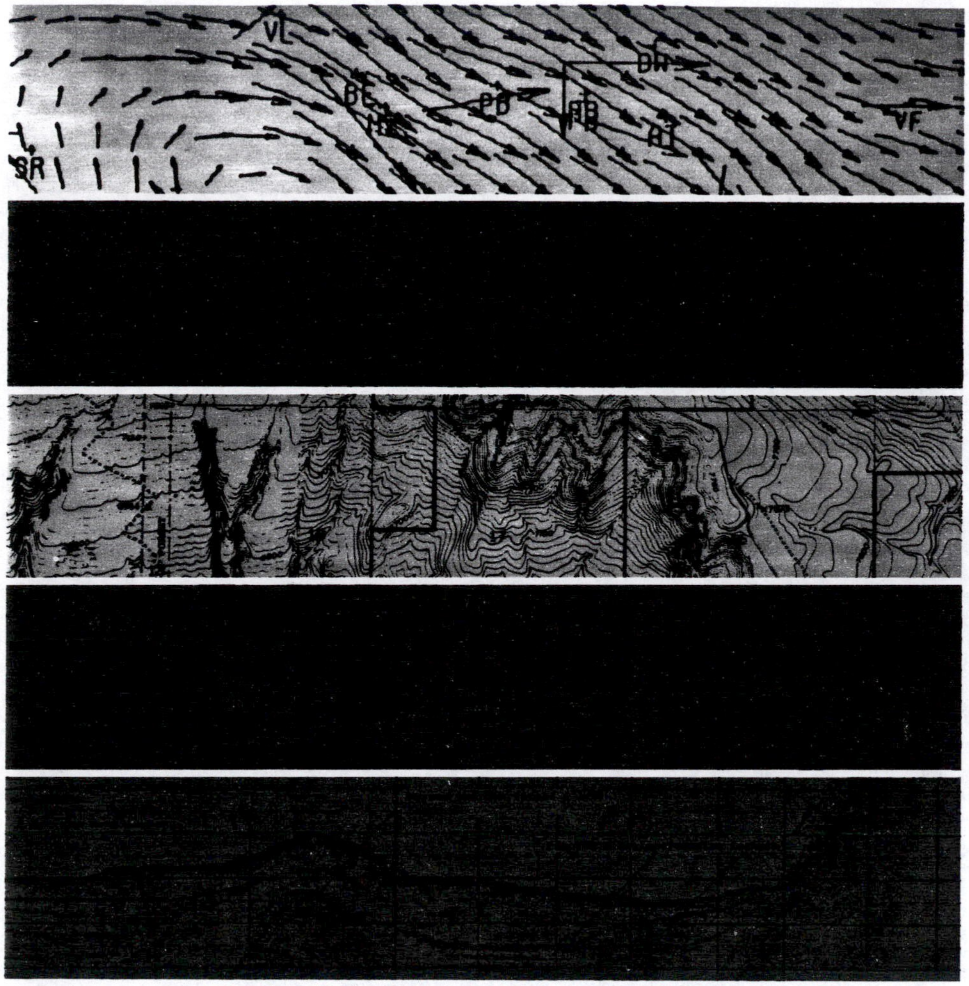

Dames & Moore

CLOSURE PLAN AND COST ESTIMATE
FOR WASTE DISPOSAL AREA - BUILDING 5
COLUMBIA INDUSTRIAL PARK
VANCOUVER, WASHINGTON

For
HILLMAN PROPERTIES NORTHWEST, INC.
17809-001-005
October 31, 1988

Dames & Moore

CLOSURE PLAN

AND COST ESTIMATE FOR

WASTE DISPOSAL AREA

BUILDING 5
COLUMBIA INDUSTRIAL PARK
2000 EAST COLUMBIA WAY
VANCOUVER, WASHINGTON

Hillman Properties Northwest, Inc.

October 31, 1988

PREFACE

The closure plan and cost estimate in this document describe the procedures that Hillman Properties Northwest, Inc. (Hillman) has conducted or will conduct to close the waste disposal area at Building 5, Columbia Industrial Park, 2000 East Columbia Way, Vancouver, Washington. The plan has been prepared in conformance with the requirements of 40 CFR Part 265, Subpart G, and WAC 173-303-400.

Section 1.0 of this document describes the waste disposal area and presents the closure methods Hillman has taken to date and the additional procedures required to attain clean closure.

The cost summary for closure is presented in Section 2.0, together with the assumptions used to develop the costs and the detailed cost estimates for the waste disposal area closure activities.

The approved Closure Plan and any subsequent amendments will be kept at the facility until the Closure Plan has been implemented and completed. Hillman will close the facility immediately upon approval of this Closure Plan by the US Environmental Protection Agency (EPA) and/or the Washington Department of Ecology (Ecology). As a consequence, amendments of cost and technical segments of the approved plan are not anticipated.

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1.0 CLOSURE PLAN

WASTE DISPOSAL AREA
BUILDING 5
COLUMBIA INDUSTRIAL PARK
2000 EAST COLUMBIA WAY
VANCOUVER, WASHINGTON

1.1 FACILITY IDENTIFICATION

1.1.1 Facility Identification WAD 980979751
Owner/Operator Name: Hillman Properties Northwest, Inc.
Address and Telephone Number: 900 North Tomahawk Island Drive Way
Portland, Oregon 97217
(503) 283-4111

1.1.2 Facility Address: 2000 East Columbia Way
Vancouver, Washington

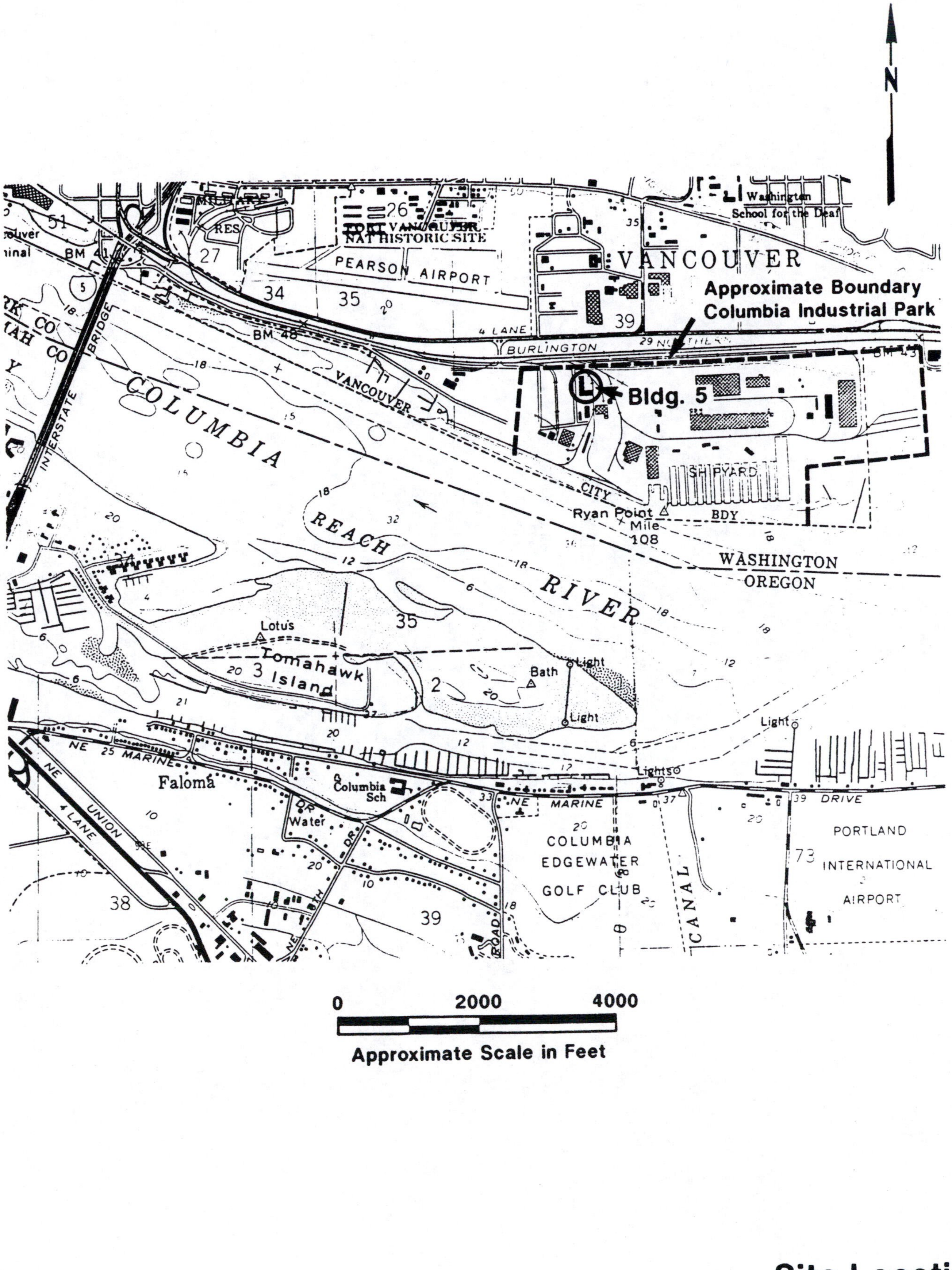
1.1.3 Person Responsible for Maintenance of the Facility Closure Plan: Douglas A. Hardesty
Address and Telephone Number: Hillman Properties Northwest, Inc.
900 North Tomahawk Island Drive Way
Portland, Oregon 97217
(503) 283-4111

1.2 INTRODUCTION

1.2.1 Background and Site History

This Closure Plan is written pursuant to and in partial satisfaction of a Consent Agreement and Final Order of the U.S. Environmental Protection Agency (EPA), Docket No. 1088-01-01-3008, between Hillman Properties Northwest, Inc. (Hillman) and EPA.

Hillman operates the Columbia Industrial Park (CIP), a 200-acre property located on the north bank of the Columbia River in Vancouver, Washington (Figure 1). The property, used as a shipbuilding facility through World War II, is now the site of numerous buildings housing primarily light industrial and commercial tenants. The Consent Agreement and Final Order requires closure of a 120-foot by 180-foot area northeast of Building 5. It has been contaminated by lead wastes generated by a former tenant, Cascade Tempering, Inc. (Cascade), which was adjudged bankrupt in late 1985.



Reference: USGS 7.5 Minute Series Portland Quadrangle Revised 1977

Site Location
Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore

As set out in an earlier site investigation report, Soil Contamination Investigation, Building 5, Columbia Industrial Park (Applied Geotechnology, Inc., October 10, 1986, hereafter referred to as the AGI report), Cascade and its predecessors conducted glass tempering operations at Building 5 from August 1980 to April 1984. The operations consisted of applying various specialty paints to glass and drying the paint with electric heaters. The glass was then wiped clean, tempered in a furnace at 1100 to 1300°F, and passed through an air-quenching unit.

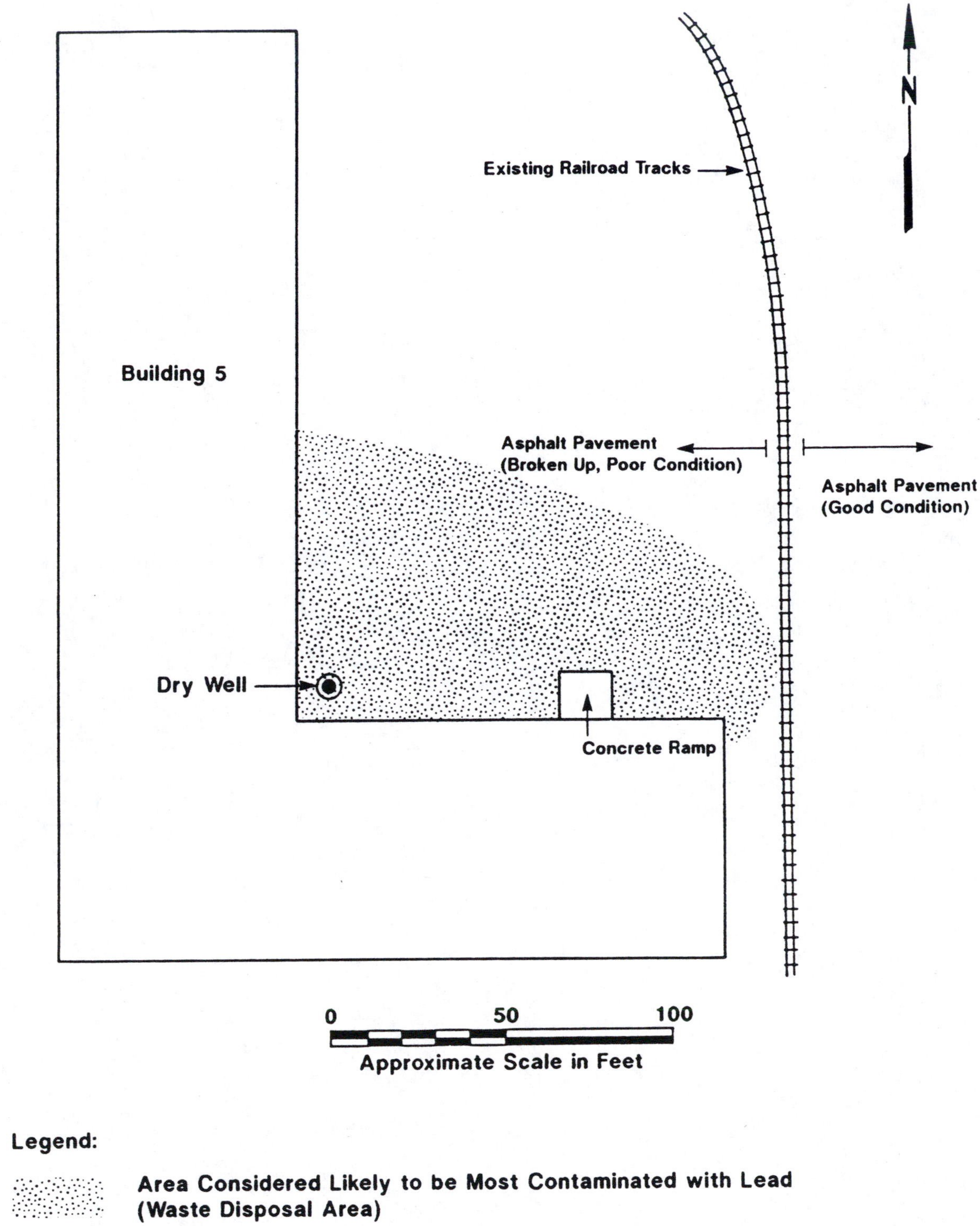
The specialty paints reportedly were composed of approximately 50 percent lead in the form of inorganic lead compounds and 1 to 2 percent each of cobalt, zirconium, chromium, nickel, antimony, and selenium compounds. Cadmium was present at 5 percent.

The glass tempering operations generated paint residue sludge and dust. Some sludge was reportedly discharged directly into a drywell located outside Building 5 (Figure 2). The drywell was constructed of 4-foot diameter concrete casing installed to an approximate depth of 8 feet. Waste paint sludge was piped directly from the paint booth to the drywell. The drywell also received runoff from the adjacent parking lot. Dust and other waste materials were dispersed through the parking lot from two air vents which discharged paint dust from the east side of the building. It was reported to the Washington Department of Ecology (Ecology) that many leaking or tipped buckets of paint sludge were also stored on the northeast side of the building. As a consequence of these activities, subsurface soils around the drywell and surface soils on the northeast side of Building 5 were contaminated with paint residue.

1.2.2 Cleanup Activities to Date

Ecology collected soil samples from the area on October 30, 1984. Both cadmium and lead were detected in EP Toxicity (EP Tox) test extracts at concentrations above State of Washington Dangerous Waste limits. The maximum EP Tox lead value detected was 440 ppm (state limit is 5.0 ppm); the maximum EP Tox cadmium value detected was 2.6 ppm (state limit is 1.0 ppm). Consequently, the soils were designated a Dangerous Waste pursuant to Washington Dangerous Waste Regulations (WAC 173-303). Ecology subsequently requested that Cascade initiate a soil and ground-water investigation to determine the extent of contamination.

In February 1985, Cascade's consultant, Sweet, Edwards and Associates, Inc. began an initial site investigation and a preliminary



Site Plan
(Surface Features through July 1985)
Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore

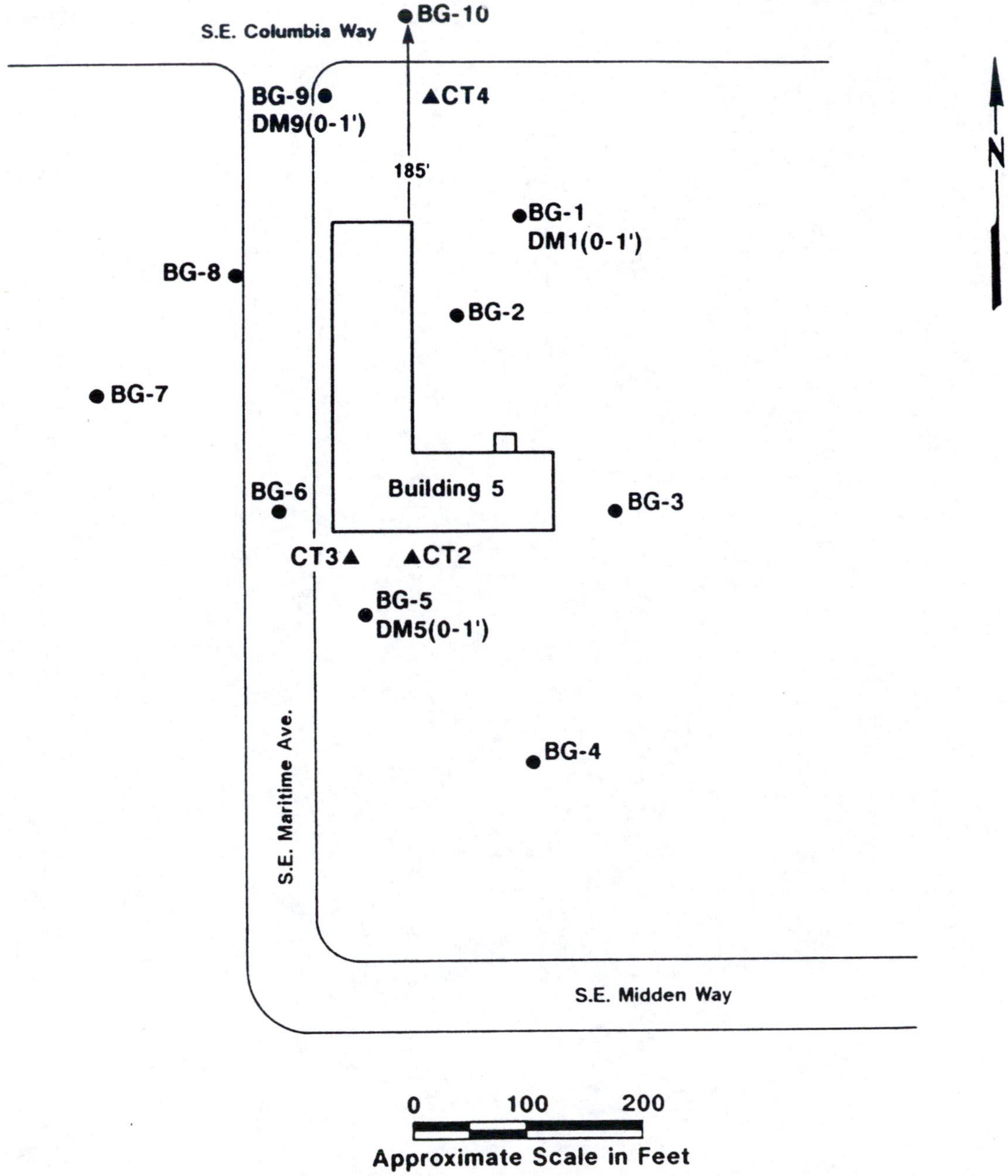
cleanup of visually contaminated soil. Four borings were drilled around Building 5 and three of them were completed as ground-water monitoring wells (Figure 3). Ground-water samples were obtained from two of the wells and analyzed for lead and cadmium; neither was detected. Soil samples from the borings were analyzed for eight metals using EP Tox procedures; none were detected. Thirty-four 55-gallon drums of visually contaminated soil were also collected and composited for EP Tox analysis. The analytic results from the drum samples showed cadmium and lead in the extract at concentrations similar to those reported by Ecology in 1984, at values above the standards for designation as Dangerous Waste.

In July 1985, Chem Security Systems, Inc. (CSSI) completed a second, more substantial cleanup of the waste disposal area (see Figure 4). The interior of Building 5 was decontaminated in accordance with Ecology instructions. Outside Building 5, approximately 125 cubic yards of visually contaminated soil were removed and transported to the secure landfill at Arlington, Oregon, including the concrete drywell and all soil in an area 10 feet deep and 15 feet in diameter around the drywell. The soil removed included materials sampled by Ecology in October 1984.

Prior to the cleanup, CSSI consultant Dames & Moore obtained ten surface soil samples from the area immediately outside the waste disposal area to establish background lead concentrations (see Figure 3). Following cleanup, an additional ten background samples (see Figure 5) were collected. A number of composite samples from the cleanup area were also collected. Background sample constituent concentrations were compared to concentrations from cleanup area samples to determine whether the soils remaining in place following excavations were comparable to background soils. The comparisons showed high concentrations of lead remained in the cleanup area.

Given this result, Ecology requested, in a November 27, 1985 letter to Cascade, that a detailed plan be prepared to systematically evaluate the extent of the remaining contamination. Cascade became insolvent before a detailed plan could be prepared. Hillman, Cascade's landlord, pursued the cleanup activity and selected a consultant (Applied Geotechnology, Inc., hereafter AGI) to prepare and implement a detailed contamination investigation plan.

In July 1986, AGI initiated an investigation that included installation and sampling of four ground-water wells, as well as collection and analysis of 60 soil samples. Soil samples were obtained from locations in a random sample grid designed by AGI to cover the waste



Legend:

● BG-9	Number and Approximate Location of Dames & Moore 7/2/85 Surface Soil Sample
DM (0-1')	AGI Resampling of BG Sampling Location Depth Interval 0-1 Feet
▲ CT4	Groundwater Monitoring Wells Installed by Sweet, Edwards and Assoc.

Sweet, Edwards Monitoring Wells and Dames & Moore Background Sample Locations

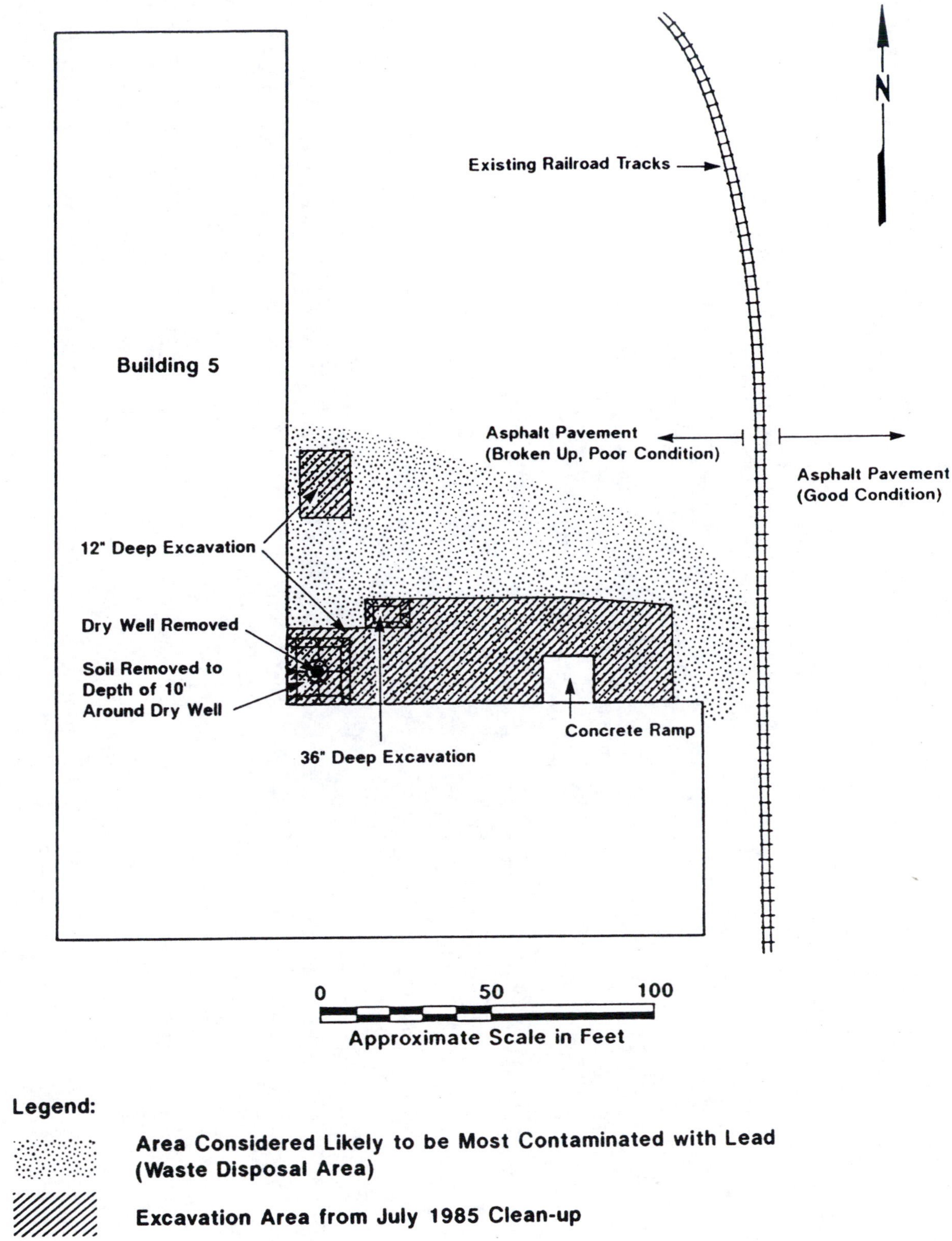
Columbia Industrial Park, Building 5

Waste Disposal Area Closure

Dames & Moore

Job No. 17809-001

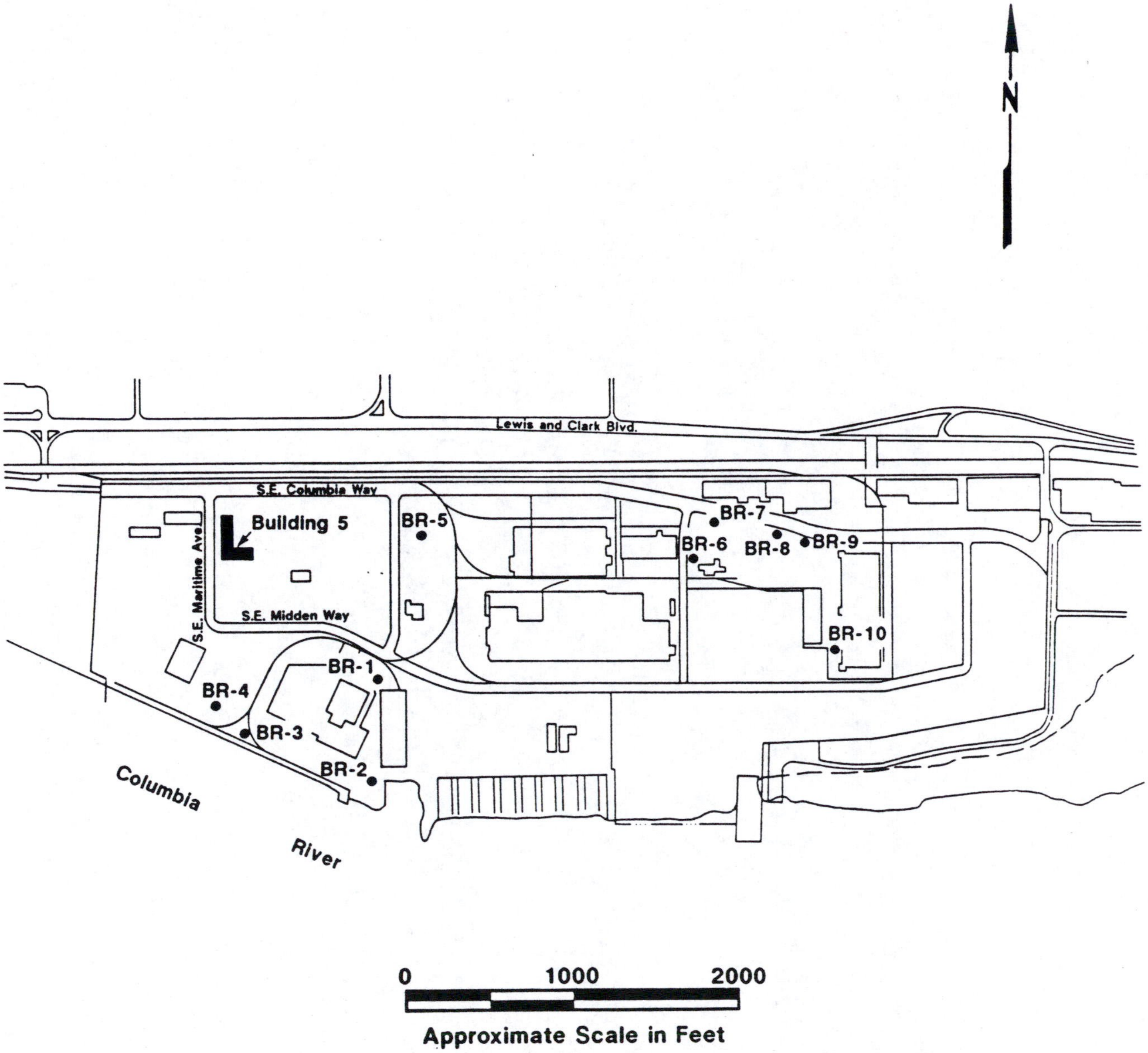
Figure 3



CSSI Excavations
Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore

Job No. 17809-001

Figure 4



Legend:

BR-1 • Number and Approximate Location of Dames & Moore 7/29/85 Surface Soil Sample

Dames & Moore

Additional Background Sample Locations

Columbia Industrial Park, Building 5
Waste Disposal Area Closure

Dames & Moore

Job No. 17809-001

Figure 5

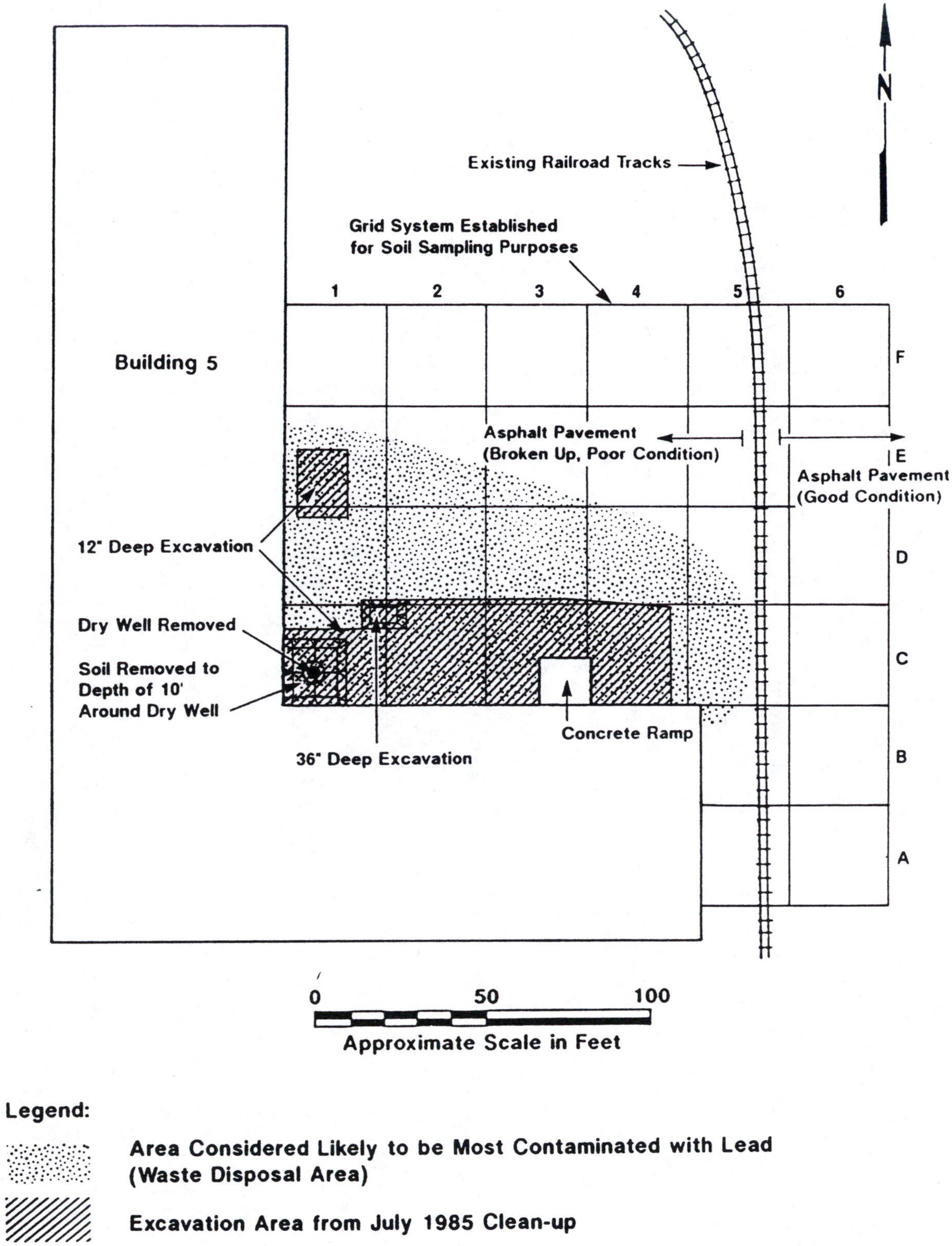
area and extend beyond its margins and from background locations (Figures 6 and 7). Ground-water samples were analyzed and again, no contaminants were detected at or near levels of concern. Soil samples were collected at four depth inter-vals (0-1, 1-3, 3-6, and 6-10 feet below original ground surface) at locations in a sampling grid. Soil samples were also collected from each monitoring well boring and composited within the 1-3, 3-6, and 6-10-foot depth intervals. All soil samples were analyzed for total lead.

Analysis results for AGI's non-waste area and boring samples and the Dames & Moore background data obtained one year earlier were used to define background conditions. The mean lead concentrations for each depth of the waste disposal area were then statistically compared to the mean lead concentrations for each depth in background using a Wilcoxin Rank Sum non-parametric test (at the 95 percent significance level). The test result indicated that although the waste area soil lead concentrations were higher than background values, the mean lead concentration values were statistically equivalent. AGI concluded in a report issued October 10, 1986, that, based on these results, additional remediation was not required, although removal of two specific areas of elevated lead concentrations was recommended (Grid C-3, 0-10 feet and Grid A-5, 0-1 foot; see Figure 6).

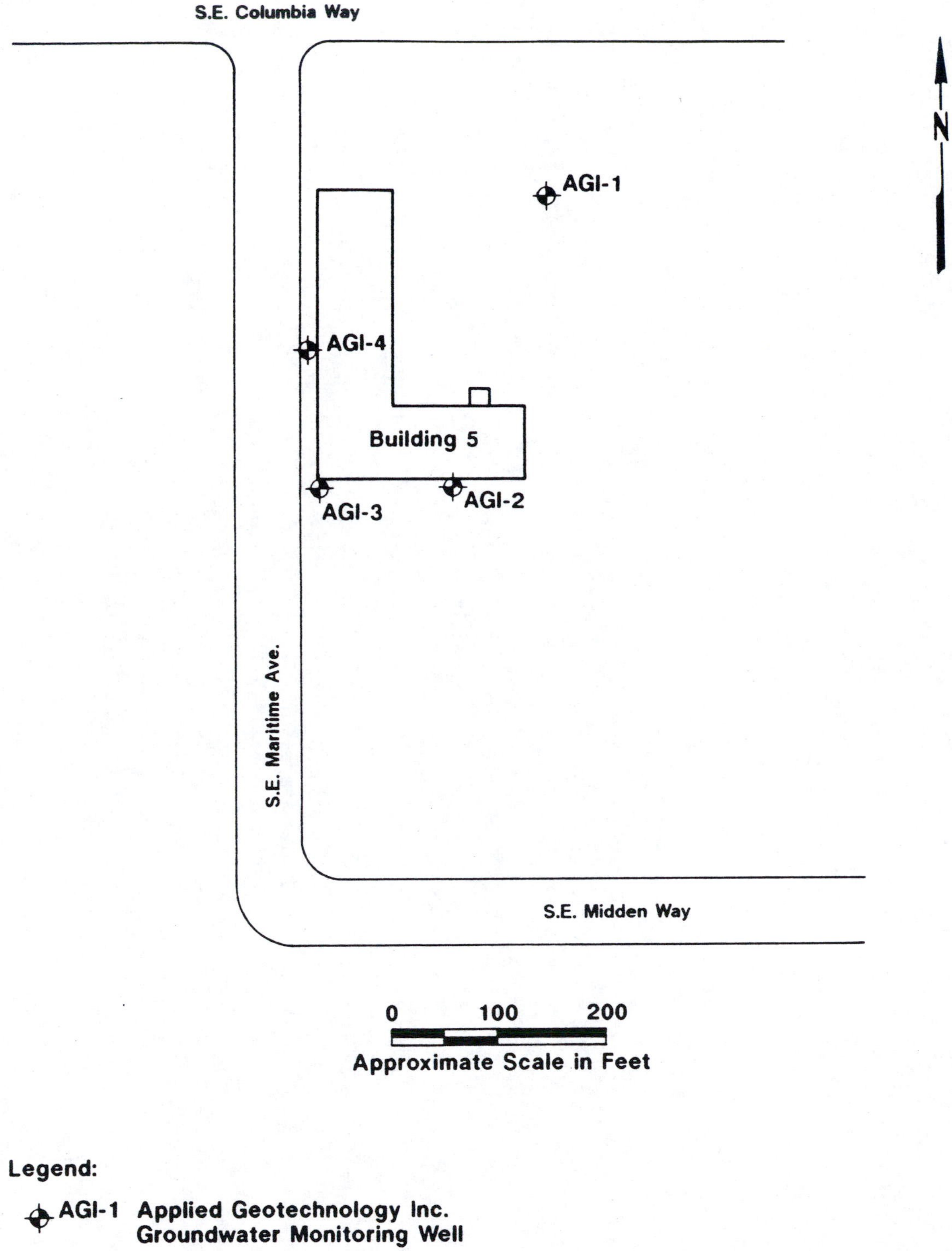
On October 20-23, 1986, AGI excavated soils from Sample Grid C-3 to a depth of 10 feet below ground surface, and from Sample Grid A-5 to a depth of 1 foot below ground surface. Samples were collected at the base of the C-3 excavation; lead concentrations there were below the 6-10-foot background standard. No samples were collected at the base of the A-5 excavation because analysis results of soil samples collected previously from below the 0-1-foot depth were below the background standard. The soils removed from both grids were depth-segregated and stockpiled. Depth segregated samples were collected and analyzed for EP Tox concentrations of lead. Analysis results were well below the hazardous waste definitional standard, 5.0 ppm.

Following excavation of Grids C-3 and A-5, Hillman, in reliance on the conclusions and recommendations of its technical consultant, AGI, notified Ecology that cleanup was completed, and after a period during which Ecology made no reply, proceeded with restoration of the truck loading/parking area. Restoration included (see Figures 8 and 9):

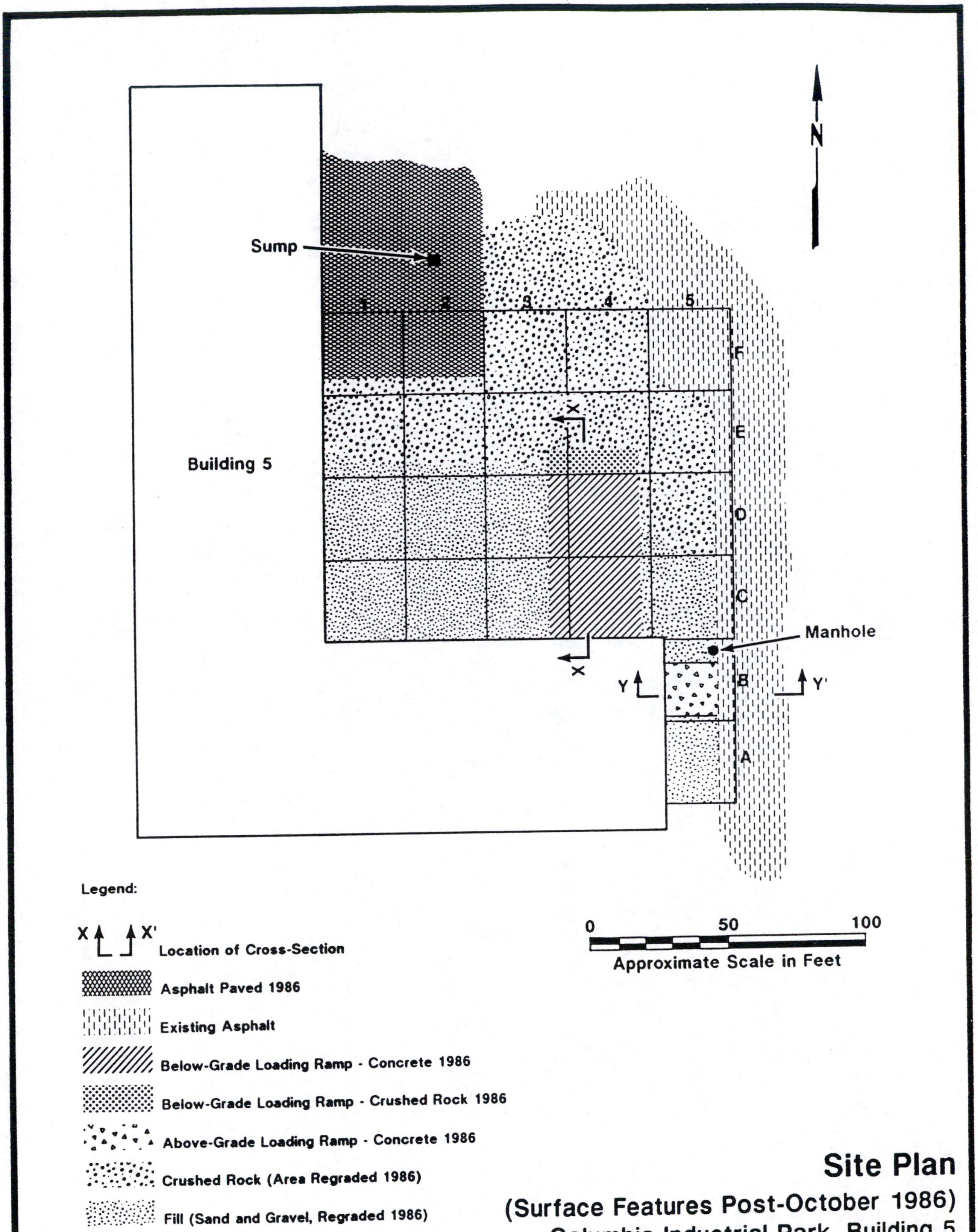
- Construction of an above-grade concrete ramp to Building 5 in the area of Grid B-5;



AGI Investigation Sample Grid
Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore



AGI Groundwater Monitoring Wells
Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore



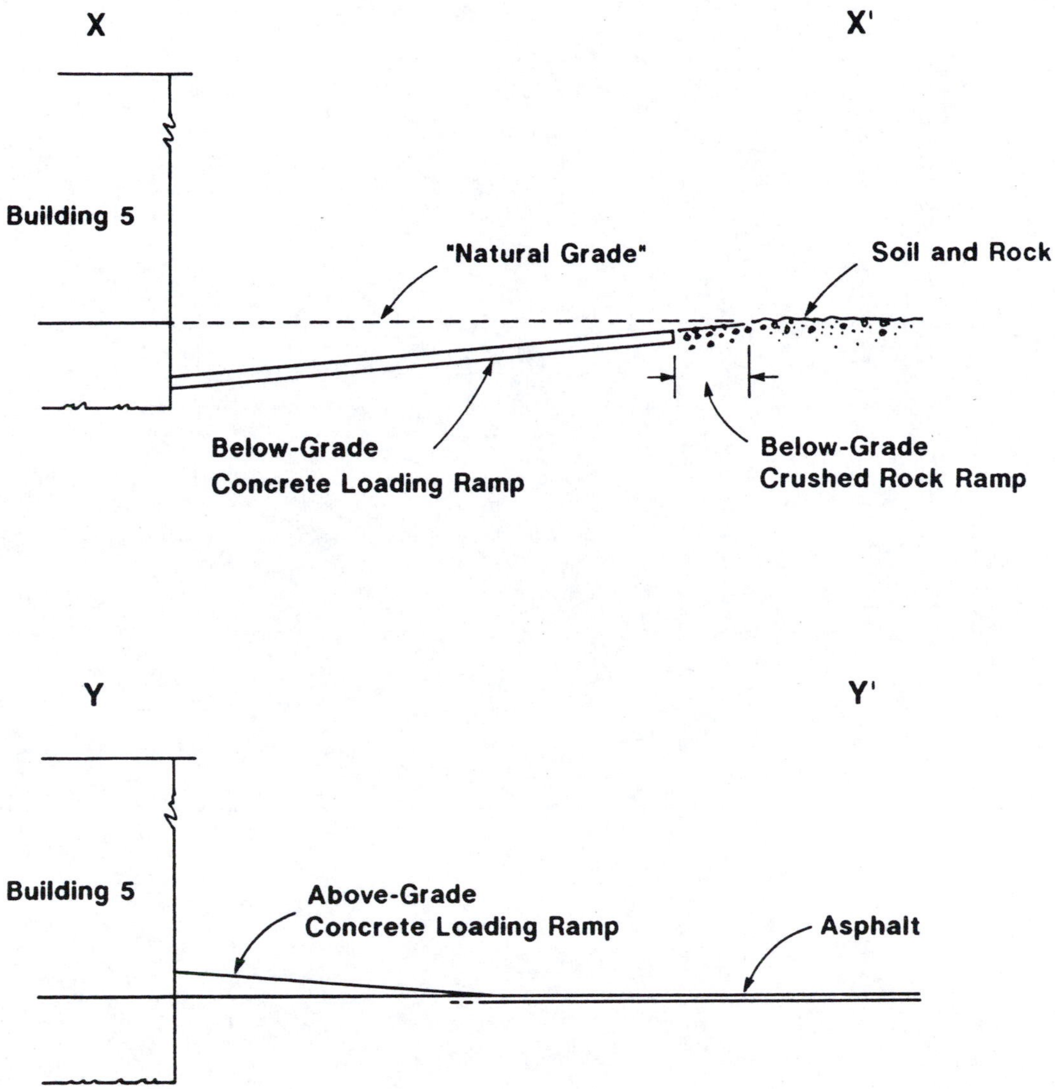
Site Plan

(Surface Features Post-October 1986)
Columbia Industrial Park, Building 5
Waste Disposal Area Closure

Dames & Moore

Job No. 17809-001

Figure 8



Not to Scale

Cross-Sections

Columbia Industrial Park, Building 5
Waste Disposal Area Closure
Dames & Moore

- Construction of a below-grade concrete truck ramp to Building 5, generally in the area of Grids C-4 and D-4;

- Asphalt paving in the northwest portion of the area;

- Regrading the central and northern portions of the area and covering with a nominal 6-inch depth of crushed rock; and

- Regrading the southeastern portion of the area, using clean fill for backfill where needed.

1.2.3 Current Status

Apparently no additional actions concerning Building 5 cleanup activities were taken by either Hillman or Ecology until the initiation of EPA involvement in July 1988. It is EPA's contention, which has been accepted by Hillman in the Consent Agreement and Final Order, that soils adjacent to Building 5 continue "to contain lead at regulated levels". This Closure Plan describes the procedures by which all regulated waste will be removed and disposed, and by which the Building 5 area will be clean closed.

1.3 SITE CONDITIONS

The interior of Building 5 was decontaminated in July 1985 and has subsequently been leased to a business unrelated to this matter. The waste disposal area excavations have been filled and graded and two concrete truck-loading docks have been constructed in the areas excavated for cleanup of grids C-5 and A-5. The entire area is currently used for parking and truck loading.

1.4 CLOSURE ACTIVITIES TO DATE

This Closure Plan represents the first element of a formal closure program. Previous waste area cleanup activities are described in Section 1.2.2.

1.5 FINAL CLOSURE ACTIVITIES

1.5.1 Closure Strategy

The Closure Plan is designed to achieve clean closure.

Previous technical studies have made available a large data base that can be used for clean closing the waste area. Hillman intends to use the existing data in as conservative a manner as possible. New waste disposal area data will be obtained from the areas disturbed by site restoration activities.

The indicator parameter used is lead. Lead is consistently the most elevated constituent of the waste. It was the major constituent of the paint from which the waste was generated (lead 50 percent, cadmium 5 percent, other constituents 2 percent or less). It has consistently been found at concentration levels two or more orders of magnitude greater than cadmium in both total and EP Tox analyses of Building 5 waste materials and contaminated soils (where both were analyzed).

Operational background concentrations of indicator constituents are established in Section 1.5.2, below. Operational background concentrations are established by using only the most appropriate and technically defensible of the existing background data (see Section 1.5.2.1). EPA approved methods described in Section 1.5.2.2 will be used to statistically compare background and waste area data. Existing waste area data will be used except where the current surface has been disturbed by property restoration activities. New samples will be collected and analyzed from disturbed areas, generally the 0-1 foot depth (below any gravel cover). Statistical comparison of background concentrations of indicator constituents and individual sample grid concentrations of indicator constituents will delineate the areas and depths of soil excavation, if any are required to obtain clean closure.

Following any excavation required for clean closure, the base of the excavated areas will be sampled to confirm sufficient removal of contaminated material unless there is existing confirmation data from the depth interval below the excavation. Excavated soils will also be analyzed to determine appropriate disposal locations. Materials to be disposed will be managed and disposed in accord with applicable regulations. Excavated areas will be backfilled.

A final round of ground-water samples will be collected from AGI monitoring wells to confirm existing ground-water data, which indicates that ground water has not been affected by waste disposal.

1.5.2 Background Concentration for Lead

1.5.2.1 Background Data

Background samples have been obtained by Sweet, Edwards and Associates, Inc. (four soil borings for installation of monitoring wells, February 1985), Dames & Moore (ten background samples near the waste area on July 21, 1985, and ten additional background samples, collected on July 25 and 29, 1985), and AGI (four soil borings for installation of monitoring wells, July 15-18, 1986, and resamples of three Dames & Moore background sample locations, July 16, 1986).

Dames & Moore has reviewed the available background data and will use only the AGI-generated data to establish background lead standards. This selection is based on the following factors:

- Sweet, Edwards data are not applicable because they are not depth segregated. The samples were composited over the full depth of the boring, while waste area samples are defined by discrete depth intervals. In addition, because Sweet, Edwards samples were tested for metals concentrations in EP Tox extracts, those data are not applicable for closure determinations, which require evaluation of total concentrations.

- Dames & Moore samples are not representative of the same depth intervals as the AGI waste area samples (0-4-inch depth versus 0-12-inch depth). In addition, Dames & Moore and AGI used different laboratories to analyze samples. Using data generated from different laboratories adds an element of artifical variability that is counter-productive to the statistical comparison to be performed. While Dames & Moore background samples are more numerous than AGI background samples, AGI waste area samples proposed for the closure analysis are far more numerous and their locations are more strictly defined than Dames & Moore waste area samples. Consequently, if use of data from only one laboratory is preferred, the AGI data are both more numerous and more appropriate. AGI's laboratory, Analytical Technologies, Inc., is a CLP laboratory and its QA/QC backup data are included with existing data, which are additional factors supporting the selection of AGI's data. Analytical Technologies, Inc. will be contracted for soil sample analysis to be conducted pursuant to this closure plan.

AGI background data are presented for each of four depth intervals: 0-1 foot (from background locations BG-1, BG-5, and BG-9); 1-3 foot, 3-6 foot, and 6-10 foot (from well borings AG1-1, AG1-2, AG1-3, and AG1-4). See Figure 10.

1.5.2.2 Statistical Procedures for Clean Closure

In the past several years, EPA Region 10 has proposed, developed, and modified a statistical procedure for determining if final closure of a hazardous waste unit is appropriate. The basic function of the procedure is a comparison of concentrations of given constituents in individual hazardous waste unit samples to the established background concentrations of those constituents. In its most recent form, the procedure permits two alternative tests:

- Compare the highest background value that is not a "common-sense" outlier[1] with each unit sample value. Each unit value that is larger than the maximum background value fails the test.

- Compare the mean-plus-two-standard-deviation "critical value" of the background data set with each unit sample value. Each unit value that is larger than the critical value fails the test.

Operators attempting to satisfy the closure standard may use either or both tests. In addition, because metals are acknowledged to occur in nature in log-normal distribution, background inorganic constituent values may be transformed to natural logarithm values for the critical value calculation.

Region 10 also has approved the practice of eliminating a constituent from examination at a sample location and depths below the depth at that location at which that constituent passes the background comparison.

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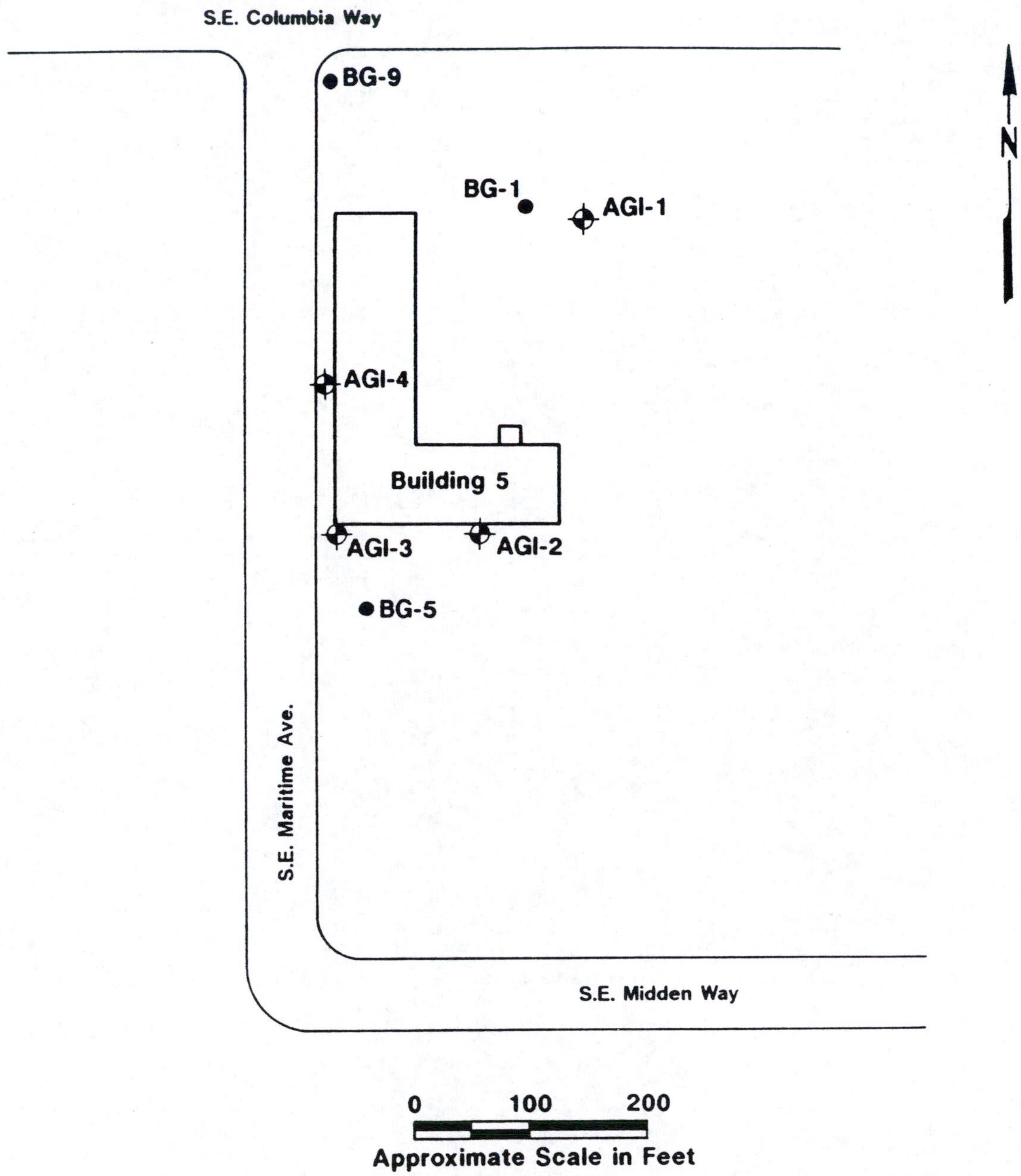
[1] an earlier version of the test, an iterative procedure for removing statistical outliers resulted too frequently in discarding all but the lowest background values from considerations. This was particularly noticeable with background data sets that contained little variance. To remedy the situation, statistical outliers are no longer removed (George Hofer, EPA Region 10, personal communication October 1986).



Legend:

AGI-1 Number and Approximate Location of AGI Background Soil Sample at 1-3, 3-6, and 6-10 Feet Depth Intervals

BG-9 Number and Approximate Location of AGI Background Soil Sample, 0-1 Foot

Background Data Locations Used for Final Closure

Columbia Industrial Park, Building 5

Waste Disposal Area Closure

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Figure 10

These statistical comparison methods are used below to identify soils not comparable to background conditions, which will be removed to clean close the unit.

1.5.3 Waste Area Surface Data

1.5.3.1 Existing Data

Existing waste area data were evaluated to determine their continued integrity with respect to closure procedures following site restoration activities (excavation, grading, and cover emplacement). See Table 1-1. The results indicate that, in general, existing data for depth intervals 1-3, 3-6, and 6-10 feet were unaffected and may be used with confidence for comparison to background values. Data generated for the 0-1-foot depth, however, are of uncertain integrity given grading and other activities performed for site restoration. Consequently, existing data will be used except for the 0-1-foot depth, which will be resampled.

1.5.3.2 Closure Sample Collection and Analysis

One closure sample will be collected at each of nine grid locations at the 0-1-foot depth (below gravel cover). This sampling design provides 50 percent coverage of the waste disposal area that was disturbed but not excavated in October 1986. Selection of sample locations (Figure 11) was based on an alternating "checkerboard" grid pattern, which will provide data that are statistically representative of the 0-1-foot depth of the site.

Samples will be collected by hand auger. Each grid sample will be a laboratory composite of four subsamples, and will be analyzed for total lead by Analytical Technologies, Inc.

1.5.4 Comparison of Background Values to Waste Area Data

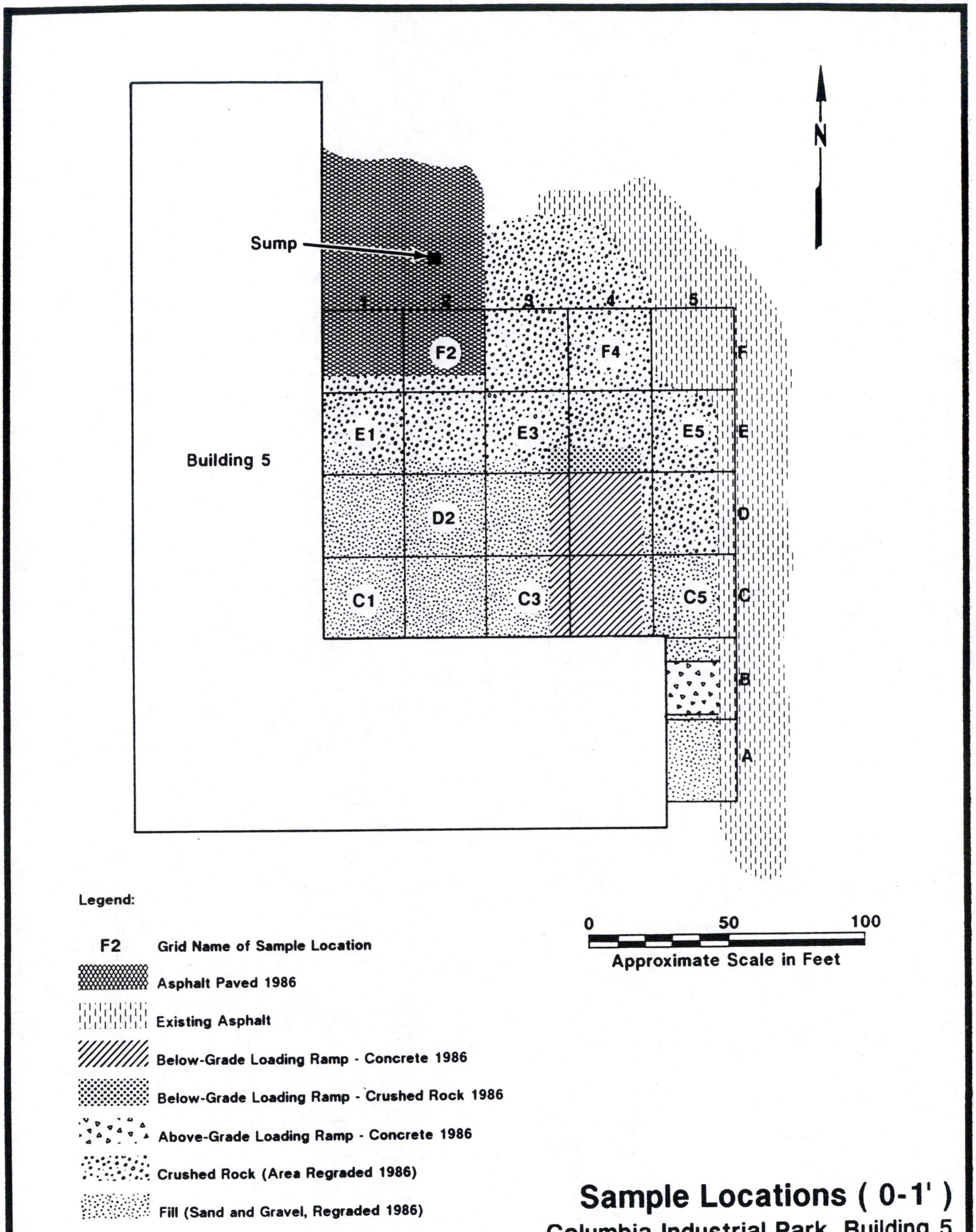
Background lead critical values for segregated depth intervals established from AGI data (Table 1-2) are (in ppm total lead):

° Depth 0-1 foot	135.82
° Depth 1-3 feet	32.85
° Depth 3-6 feet	13.82
° Depth 6-10 feet	19.33

TABLE 1-1

AGI WASTE AREA SAMPLE RESULTS

Grid	(Depth, Feet Below Surface)	Lead (ppm)	Sample Disturbed?
A5	(0-1)	1606	Yes, excavated 10/86
B5	(0-1)	2.2	Yes, covered by concrete ramp
C5	(0-1)	186	Yes, graded
D1	(0-1)	48.5	Yes, graded
D2	(0-1)	566	Yes, graded
D3	(0-1)	2.5	Yes, graded
D4	(0-1)	300	Yes, excavated for concrete ramp
D5	(0-1)	426	Yes, graded
E2	(0-1)	132	Yes, graded
E3	(0-1)	260	Yes, graded
E4	(0-1)	462	Yes, graded
E5	(0-1)	378	Yes, graded
F1	(0-1)	83.8	Yes, covered by asphalt
F2	(0-1)	102	Yes, covered by asphalt
F3	(0-1)	127	Yes, graded
F4	(0-1)	327	Yes, graded
A5	(1-3)	3.0	No
C2	(1-3)	9.4	No
C3	(1-3)	79.7	Yes, excavated
C5	(1-3)	2.6	No
D1	(1-3)	8.7	No
D2	(1-3)	8.1	No
D4	(1-3)	33.5	Yes, excavated for concrete ramp
E1	(1-3)	3.9	No
E3	(1-3)	4.9	No
E5	(1-3)	7.0	No
F2	(1-3)	79.1	No, but covered by asphalt
F4	(1-3)	2.9	No
C2	(3-6)	4.4	No
C3	(3-6)	34.0	Yes, excavated
C5	(3-6)	3.6	No
D1	(3-6)	3.9	No
D2	(3-6)	8.2	No
D4	(3-6)	6.4	Yes, partially excavated for concrete ramp
E1	(3-6)	2.6	No
E3	(3-6)	3.7	No
E5	(3-6)	20.8	No
C2	(6-10)	24.4	No
C3	(6-10)	33.4	Yes, excavated
C5	(6-10)	5.0	No
D1	(6-10)	7.8	No
D2	(6-10)	11.6	No
D4	(6-10)	23.3	Yes, partially excavated for concrete ramp



Sample Locations (0-1')

Columbia Industrial Park, Building 5
Waste Disposal Area Closure

Dames & Moore

Job No. 17809-001

Figure 11

TABLE 1-2

AGI BACKGROUND SAMPLE RESULTS

Sample or Boring Number (Depth, Feet Below Surface)		Lead (ppm)
BG-1	(0-1)	94.9
BG-5	(0-1)	22.8
BG-9	(0-1)	5.7
AG1-1	(1-3)	3.7
AG1-2	(1-3)	3.2
AG1-3	(1-3)	26.8
AG1-4	(1-3)	9.3
AG1-1	(3-6)	2.3
AG1-2	(3-6)	2.7
AG1-3	(3-6)	11.5
AG1-4	(3-6)	1.9
AG1-1	(6-10)	2.8
AG1-2	(6-10)	15.7
AG1-3	(6-10)	6.8
AG1-4	(6-10)	2.2

Critical values will be compared with individual waste area sample values. Waste area sample data will be drawn from existing and newly generated sources, as noted in Section 1.5.3. For consistency, with respect to sample location and depth and laboratory handling procedures, only data reported by Analytical Technologies, Inc. will be used. All samples to be collected pursuant to closure proceedings will be analyzed by Analytical Technologies, Inc.

Preliminary evaluation of existing AGI waste area data from depths 1-3, 3-6, and 6-10 feet with respect to established critical values indicates that only Grid F-2 may be subject to excavation (to a depth of 3 feet). The only other grid/depth data that exceed the background critical values are from those depths that were excavated after the October 1986 sample collection (Grids C-3, 1-3, 3-6, and 6-10 feet, D-4, 1-3 feet), and from grid/depth areas at depths below that at which the concentration of lead satisfied comparison to the background critical values (Grids E-5, 3-6 feet, C-2, 6-10 feet, and D-4, 6-10 feet). Note that the latter group also represent de minimus exceedances, only 4.0-7.0 ppm above background.

1.5.5 Contingent Excavation and Disposal Procedures

If any materials are required to be excavated, they will be removed by a backhoe and front-end loader and stockpiled until final handling requirements and an acceptable disposal location are determined. Stockpiled materials will be segregated by grid. They will be separated from clean underlying soils by a layer of visquene, and will be covered with visquene to prevent precipitation infiltration, runoff, and/or wind dispersal.

To confirm that all waste has been removed from each grid excavated, samples will be collected at the base of the grid following excavation of each grid to its full scheduled depth. Samples will be analyzed for total lead. Closure excavations will be completed when these samples satisfy background critical values.

Stockpiled material will be managed and disposed as dictated by its designation. Designation will be accomplished using existing data and limited additional sampling, as noted below. It is assumed that most, if not all, of the stockpiled material will be disposed of at a nonhazardous waste landfill that complies with WAC 173-304 minimum functional design standards.

Existing bioassay data demonstrate that even the most contaminated soils that have been on site at any time are non-toxic to fish. (See two

Ecology reports on samples collected by Ecology on March 1, 1985, laboratory reference numbers 109014, 109015, and 109016: Report to Vern Meinz from Don Kjosness, April 15, 1985, showing no bioassay mortality from soil samples; and Ecology laboratory data summary, signature illegible, dated April 10, 1985, showing the same samples with EP Tox concentrations up to 1288 ppm.)

Samples will be collected from stockpiled excavated materials (one per grid). EP Tox extracts of these samples will be analyzed for lead and cadmium. If these analytes are below dangerous waste standards, the results will confirm that all EP Tox metals are below standard (as has been the case with all site samples so analyzed to date). Results will also be used to determine a rough, site-specific correlation factor defining the level of total lead likely to result in an EP Tox lead level greater than 5.0 ppm. That correlation factor can then be applied to any unsampled excavated soils for which there are existing total lead data. It is Dames & Moore's experience with similar contamination conditions in the Vancouver-Portland area that a total lead concentration of 3000 ppm is the threshold at which the 5.0 ppm EP Tox standard will be exceeded.

Following designation, the material will be disposed. The type of disposal facility selected will depend on the designation of the waste. It is likely that most, if not all, of any soil required to be excavated will be disposed in a minimum functional design standard landfill or other facility permitted to accept non-dangerous wastes. Any soil designated as a dangerous waste will be disposed at a hazardous waste facility.

1.5.6 Closure, Confirmation, and Designation Sampling Protocol

1.5.6.1 Health and Safety

All sampling for Building 5 soils will be performed under a health and safety plan developed specifically for the site and for closure activities. The health and safety plan will specify personal protective equipment to be worn during closure activities.

1.5.6.2 Sample Collection Procedure

Closure samples will be collected from nine selected grids (Figure 11). Each grid will be sampled at four locations, one in each quadrant of the grid, from a full depth of 0-1 foot below ground surface (and cover materials). Materials collected from each grid-quadrant will constitute a subsample. Each subsample will be collected with a hand auger and transferred using a stainless steel spoon to a clean sample container supplied by the analytical laboratory. At the laboratory, the four subsamples from each grid will be composited and the resultant grid sample will be analyzed for total lead.

If excavation is required, confirmation and designation samples will be collected and analyzed.

Confirmation samples will be collected at the base of each grid following excavation. Each grid will be sampled at four locations, one in each quadrant of the grid, from a full depth of 0-6 inches below the excavated surface. Materials collected from each grid-quadrant will constitute a subsample. Each subsample will be collected with a stainless steel spoon and transferred to a sample container supplied by the analytical laboratory. At the laboratory, the four subsamples from each grid will be composited and the resultant grid sample will be analyzed for total lead.

One designation sample will be collected from each grid excavation stockpile. Each stockpile will be sampled at eight locations, one in the upper one-half and one in the lower one-half of each quadrant of the stockpile. Materials collected from each upper or lower grid-quadrant will constitute a subsample. Each subsample will be collected with a stainless steel spoon and transferred to a sample container supplied by the analytical laboratory. At the laboratory, the eight subsamples from each grid will be composited and the resultant grid sample will be analyzed for EP Tox concentrations of lead and cadmium.

All jars used for collecting samples will be obtained from the chemical analysis laboratory and will be prewashed. As samples are collected, the container labels will be filled out and a record of the sample maintained in the field log. Chain-of-custody forms will be completed (see below). Sample jars will be sealed and kept in an iced cooler at about 4°C until delivery to the laboratory at the end of each day.

Sampling will be documented in a field log. All conditions considered noteworthy with respect to the sampling program, such as weather conditions, observed properties of soils, odors, and deviations from the sampling protocol will be entered into the field log.

Decontamination procedures (see below) will be carefully followed to avoid any cross-contamination between samples or from the sampling equipment. The QA/QC program (see below) will include sampling and analysis of final decontamination rinse-water samples.

Control of the possession of soil samples, from the time of original sampling through completion of laboratory analysis, will be maintained to support the closure program results. Each physical sample will be assigned a unique coded identification. Chain-of-custody forms will be used to document all transfers of possession of samples. At each such transfer, the condition of the sample containers (including seals) will be inspected and any significant observations noted; the two parties involved in the sample transfer will sign the chain-of-custody form. Copies of all chain-of-custody forms will be retained in the project file. Each physical sample container will be entered on a separate line of these forms.

1.5.6.3 QA/QC

The sampling and laboratory analysis activities included in the Building 5 closure program will be supported by several types of QA/QC analyses:

- Final decontamination rinse waters from sampling equipment decontamination will be collected and analyzed for the closure parameters.
- A transport blank of deionized water will be carried into the field and submitted, unopened, for analysis for the closure parameters.
- Laboratory calibration data, based on the analyses of standards, will be maintained and reviewed for the analytical instruments.
- Matrix spike and matrix spike duplicate analyses will be performed by the analytical laboratory.
- Surrogate spike analyses will be performed for selected organic parameters.
- Reanalysis of archived aliquots of samples can be performed to check on initial results.

All QA/QC analytical results will be reported with the closure certification data report.

1.5.6.4 Decontamination

The contractor performing excavation and off-site removal of the residually contaminated soils will provide a washdown and equipment decontamination area near Building 5. Equipment exposed to potentially contaminated soil will be decontaminated in the washdown area. Decontamination rinse waters will be routed to a storm drain, as the level of diluted constituents of concern carried by rinsewaters is expected to be very low.

A multistep decontamination procedure will be used for all soil sampling equipment. The sequence of decontamination steps will be as follows:

- wash in a soapy water (using Alconox or similar laboratory quality soap)
- scrub in a dilute (1:8) ethanol/deionized water mixture
- submerge and agitate in deionized water
- scrub in a nitric acid wash
- submerge and agitate in deionized water
- rinse in a poured stream of deionized water
- air dry (weather permitting)

A decontamination area will be established during periods of sampling activity. All wash and rinse waters will be collected in 55-gallon drums and properly disposed by Hillman.

1.5.7 Backfill

Any excavated areas will be backfilled with imported non-hazardous fill and the area will be returned to use for parking and truck loading. Backfill of the area is considered a separate project and is not included as part of the schedule or cost estimate of this Closure Plan.

1.5.8 Ground Water

AGI-installed wells (AG1-1, AG1-2, AG1-3, and AG1-4) will each be sampled once as part of closure proceedings. Samples will be analyzed for pH, standard conductivity, dissolved lead, and dissolved cadmium.

The AGI wells were installed, constructed, and developed in accordance with RCRA ground-water monitoring well guidelines directing relative location (40 CFR 265.91(a)) and construction (40 CFR 265.91(c)), and the then-effective (1986) Washington well construction rules. Construction details can be found in the AGI report in Appendix A and in

Appendix B, pages 60-65. A limited hydrogeological characterization supporting the monitoring system design can be found in the AGI report text, Section 2.0, pages 25-33.

In all previous ground-water monitoring events, samples from wells installed by Sweet, Edwards and from the wells installed by AGI contained no significant or nearly significant concentrations of contaminants. It is likely that the indurated uppermost unit of fill, which generally consists of compacted base course material, and the silty gravel aquitard unit below the fill prevent introduction of the air deposited lead contamination to ground water. See the AGI characterization referenced above.

1.5.9 Schedule

Final closure of the waste disposal area consists of the following tasks:

- Prepare site Health and Safety Plan
- Conduct closure soil sampling
- Conduct ground-water sampling
- Laboratory analysis of soil and ground water
- Contingent soil excavation and stockpiling
- Contingent sampling of soil excavations and stockpiles
- Contingent laboratory analysis
- Contingent soil transportation and disposal
- Certify clean closure.

The schedule for completing these tasks is illustrated in Table 1-3, which shows that the total estimated time required to clean close the waste disposal area is variable, from about 7 to 17 weeks, depending on sample analysis results. The schedule includes a contingency period for excavation, testing and disposal, and an additional contingency period for a second round of excavation.

1.5.10 Closure Certification

An independent professional engineer will be engaged to certify that the closure has been completed in accordance with the plan specifications. It is anticipated that the professional engineer will visit the site and observe the progress of closure activities regularly during the closure.

The certifications of closure by the independent professional engineer and Hillman will be submitted to the EPA Regional Administrator

<u>TABLE 1-3</u>

SCHEDULE OF FINAL CLOSURE

WASTE DISPOSAL AREA

Task	Time, Weeks																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
° Prepare a site Health and Safety Plan	—																			
° Conduct closure soil sampling		—																		
° Conduct ground-water sampling		—																		
° Laboratory analysis of soil and ground water			—	—																
° Contingent soil excavation and sampling					—	—														
° Contingent sampling of soil excavation and stockpiles					—	—														
° Contingent laboratory analysis							—	—	—	—										
° Additional excavations and testing, if required											—	—	—							
° Contingent soil transportation and disposal											—	—		—	—					
° Certify clean closure	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

and the Director of the Washington Department of Ecology in accordance with the requirements of 40 CFR 265.115 and WAC 173-303-610.

2.0 CLOSURE COST ESTIMATE

WASTE DISPOSAL AREA
BUILDING 5
COLUMBIA INDUSTRIAL PARK
2000 EAST COLUMBIA WAY
VANCOUVER, WASHINGTON

2.1 DEVELOPMENT OF COSTS

The costs for activities associated with closure of the waste disposal area are presented in this section. The estimates are based upon the following:

- ° Unit costs are "fully loaded" and include labor, fringe benefits, overhead, and required equipment for the specific tasks.

- ° The unit costs for engineering services are for independent professional personnel.

- ° Transportation and disposal costs are based on data developed from contracting companies engaged in these businesses.

2.2 CLOSURE COST ESTIMATE

2.2.1 Cost Estimate

Hillman has expended over $150,000 to date for removal and disposal of wastes and contaminated soils adjacent to Building 5. The estimated remaining cost for clean closure of the waste disposal area is shown assuming no excavation is required. An estimated per cubic yard cost is presented for hazardous and non-hazardous material excavation, testing, and disposal, based on a nominal 400 cubic yard estimate.

These costs are based on current dollar value as of the most recent revision. A detailed cost estimate for closing the waste disposal area is given in Table 2-1.

2.2.2 Financial Assurance

Financial assurance materials will be submitted as required within 60 days of the issuance date of the Consent Agreement and Final Order.

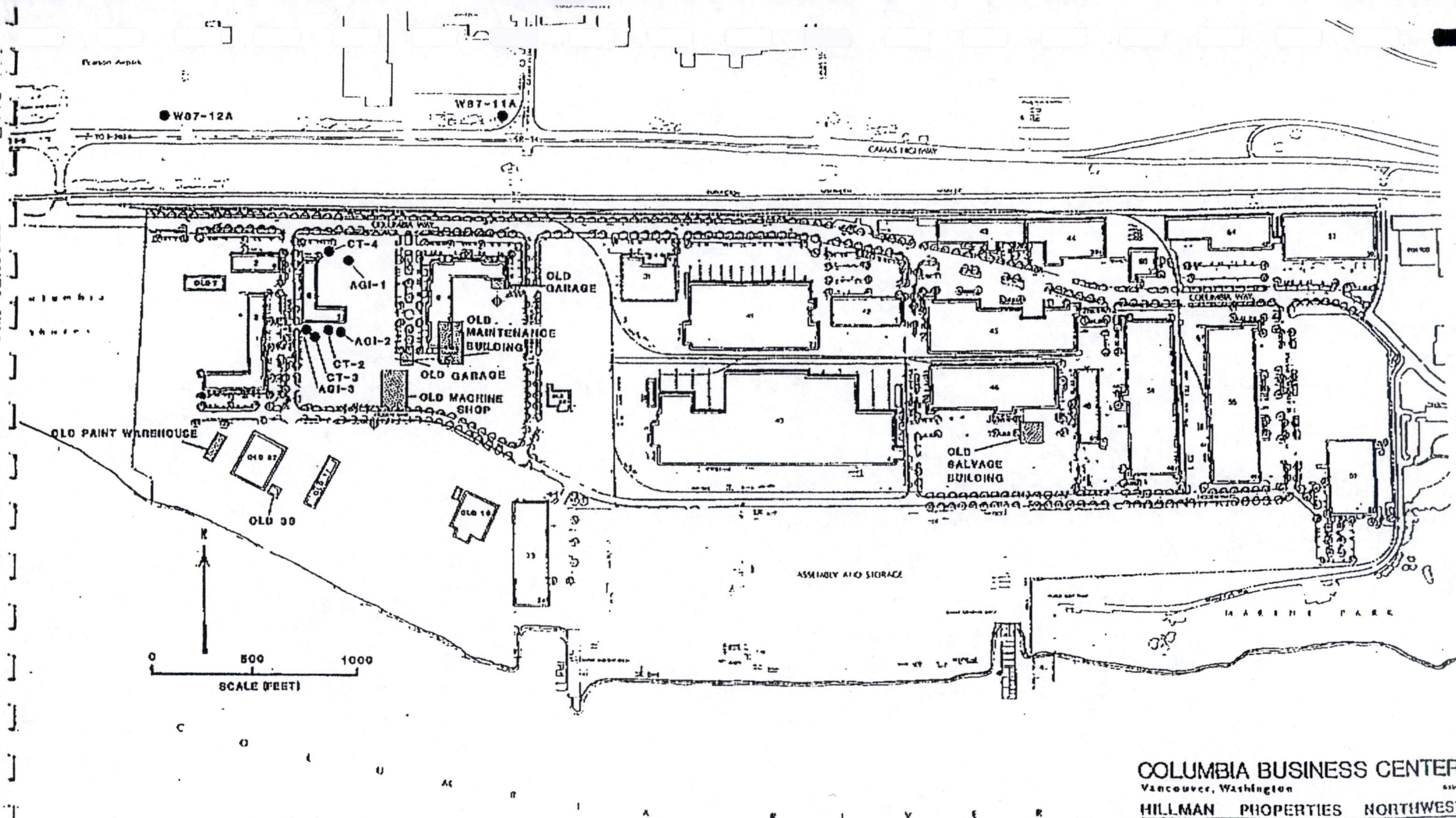
TABLE 2-1

WASTE DISPOSAL AREA
CLOSURE COST ESTIMATE
OCTOBER 31, 1988

Item	Quantity	Unit Cost	Cost
Primary Costs (Assumes no Excavations)			
Prepare Closure Plan	Lump Sum		$ 6,000
Prepare Health & Safety Plan	Lump Sum		600
Conduct closure soil sampling	10 hours	60/hour	600
Equipment/health & safety gear	Lump Sum		150
Sample ground-water	10 hours	60/hour	600
Equipment/health & safety gear	Lump Sum		250
Laboratory Analyses			
Closure samples and blanks	11 Samples	85/each	935
Ground-water samples and blanks	5 Samples	70/each	350
Closure Certification	16 hours	80/hour	1,280
Management and Administration	Lump Sum		1,800
TOTAL			$ 12,565
Contingent Costs (Hypothetical volume used to estimate per cubic yard costs: 400 cubic yards excavated from 10 grids)			
Excavate and stockpile soil	100 hours	65/hour	$ 6,500
Geotechnical supervision	100 hours	60/hour	6,000
Decontamination time and equipment	Lump Sum		3,000
Conduct confirmation and designation sampling	16 hours	60/hour	960
Equipment/health & safety gear	Lump Sum		250

TABLE 2-1 (Continued)

Item	Quantity	Unit Cost	Cost
Laboratory Analyses			
Confirmation samples and blanks	12 samples	85/each	1,020
Designation samples and blanks	12 samples	300/each	3,600
Transportation and Disposal		See Below	
Additional Closure Certification	16 hours	80/hour	$ 1,280
Additional Management and Administration	Lump Sum		2,400
Total Contingent Cost, exclusive of transportation and disposal, expressed as an estimated approximate per cubic yard cost			Estimate 100/cy
Transportation and Disposal			
Non-Hazardous Waste			Estimate 30/cy
Hazardous Waste			Estimate 210/cy



KEY:

● EXISTING WELLS SAMPLED

▨ APPROXIMATE LOCATION OF FORMER KAISER SHIPYARD BUILDINGS

JOB NO. 17009-003-005

COLUMBIA BUSINESS CENTER
Vancouver, Washington
HILLMAN PROPERTIES NORTHWEST

DAMES & MOORE
SEPTEMBER 1989

FIGURE 4

TABLE 3

Ground-Water Sampling Field Parameters
Existing Monitoring Wells

Well# Sample#	Depth of Well (feet)	Elevation of Ground-Water Level* 6/29	Elevation of Ground-Water Level* 8/22	Elevation of Top of PVC*	Average Pore Volume (gallons)	Average Electrical Conductivity (umhos)	Average Temperature (C°)	Average pH	
AGI-1	32.5	5.86	3.86	31.66	0.9	186	14.0	6.21	
AGI-2	32.4	3.62	3.72	31.72	0.7	177	13.7	5.94	
AGI-3	32.8	5.64	3.64	31.14	1.0	189	13.6	6.14	
CT-3	10.9	23.92	23.72	32.22	0.4	64	16.6	6.27	
CT-4	24.7	11.48	11.28	33.58	0.4	234	14.7	6.36	
W87-11A	28.5	—	4.18	25.28	3.3	119	12.8	2.06	pH meter
W87-12A	25.5	—	4.0	25.10	2.0	139	13.3	2.46	defective

* City of Vancouver Datum (1927 N.A.D.)

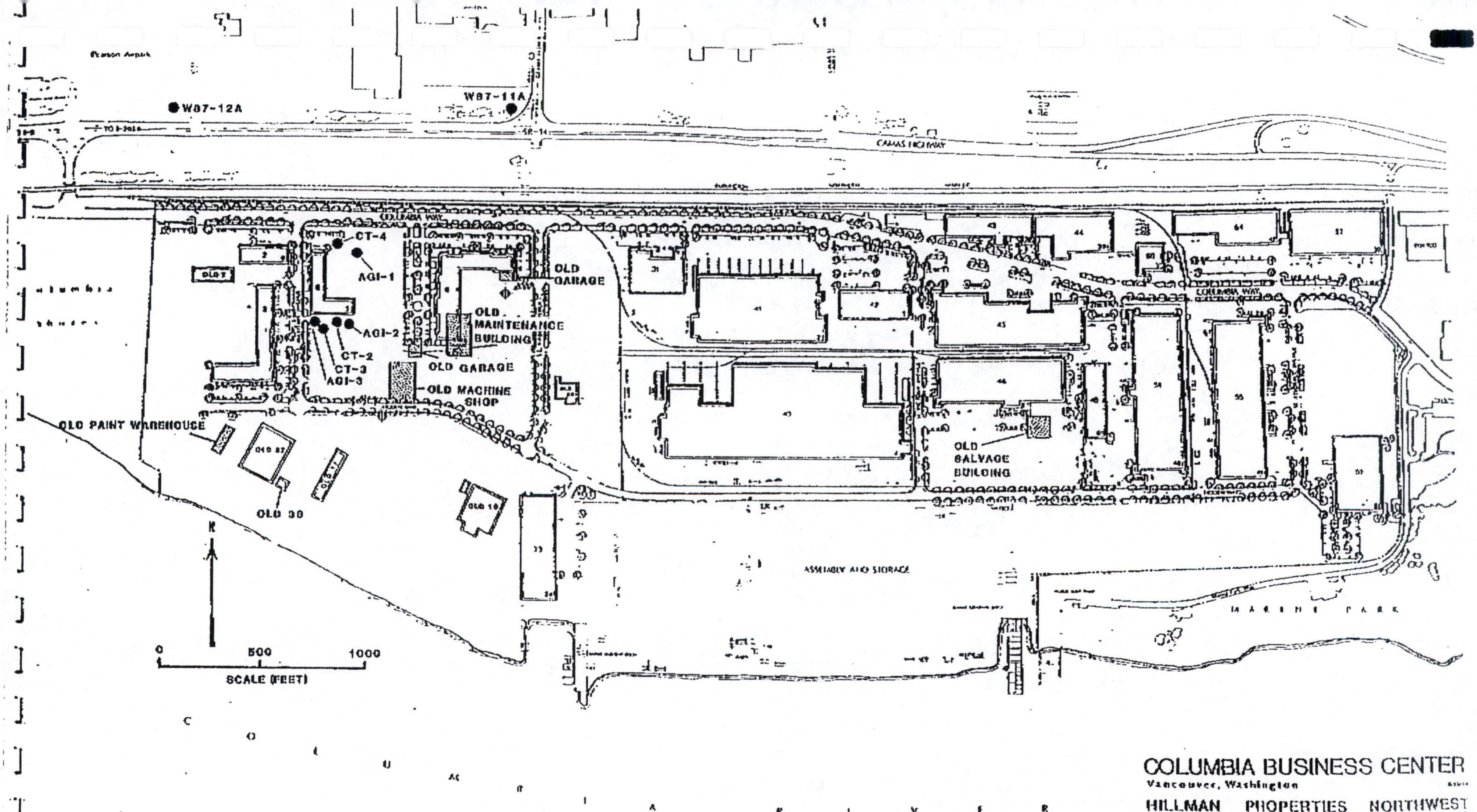
TABLE 4

Ground-Water Sample Analytical Results
Existing Monitoring Wells
(ppb)*

Well/ Sample #	Chromium	Lead	Cadmium	Mercury
AGI-1	70	6	0.6	<0.5
AGI-2	46	<5	<0.3	<0.5
AGI-3	52	<5	<0.3	<0.5
CT-3	<5	18	1.1	<0.5
Duplicate	<5	<5	0.8	<0.5
CT-4	17	<5	0.5	<0.5
W87-11A	<5	<5	0.9	<0.5
W87-12A	120	<5	0.4	<0.5

KEY

ppb: All chemical values given in parts per billion
< : Indicates target compound not detected at specified detection limit



COLUMBIA BUSINESS CENTER
Vancouver, Washington

HILLMAN PROPERTIES NORTHWEST

KEY:

● EXISTING WELLS SAMPLED

▩ APPROXIMATE LOCATION OF FORMER KAISER SHIPYARD BUILDINGS

DAMES & MOORE
SEPTEMBER 1989

JOB NO. 17609-003-005

FIGURE 4

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Ground-Water Sampling Field Parameters
Existing Monitoring Wells

Well# Sample#	Depth of Well (feet)	Elevation of Ground-Water Level* 6/29	Elevation of Ground-Water Level* 8/22	Elevation of Top of PVC*	Average Pore Volume (gallons)	Average Electrical Conductivity (umhos)	Average Temperature (C°)	Average pH
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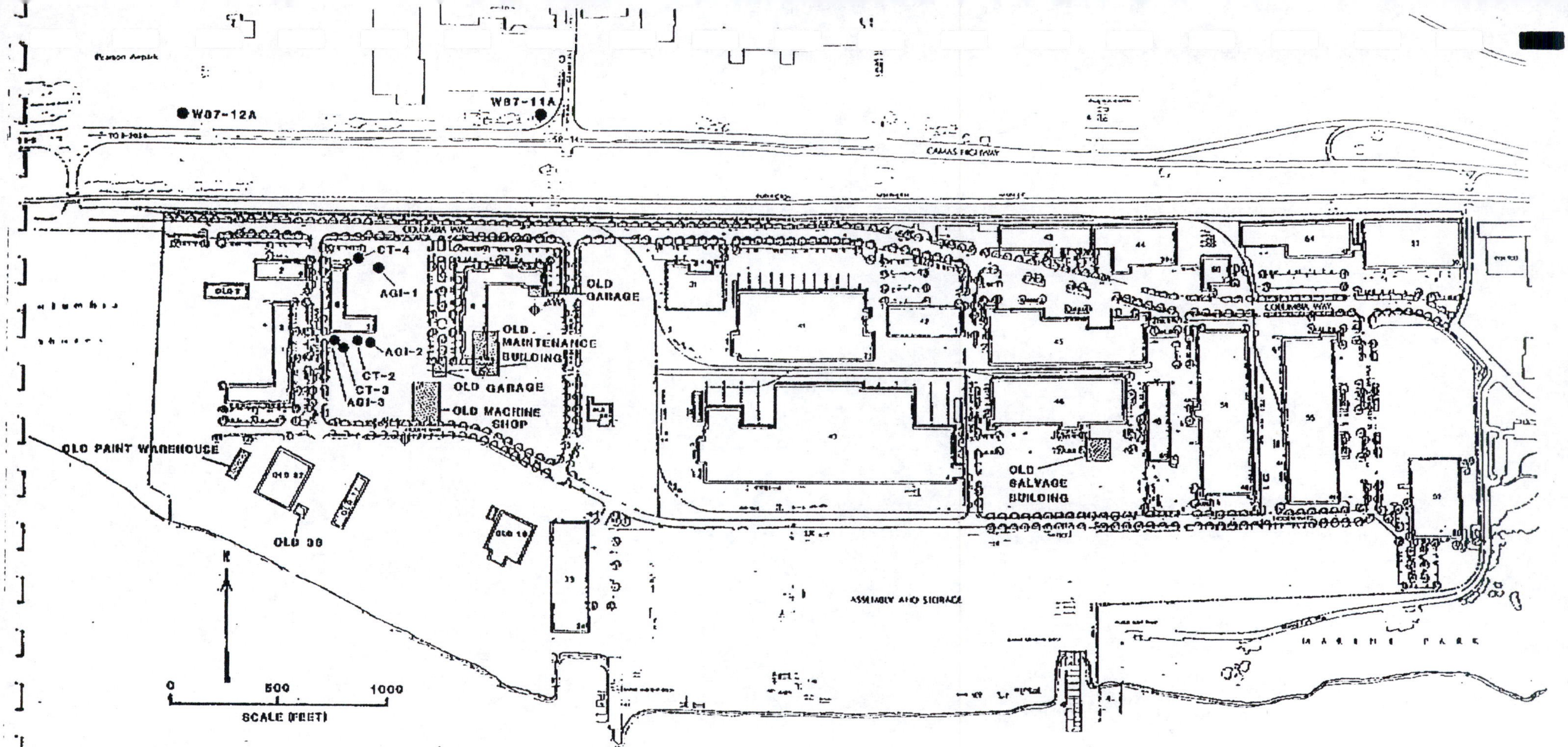

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SEPTEMBER 1989

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W87-12A	25.5	—	4.0	25.10	2.0	139	13.3	2.46

pH meter defective

* City of Vancouver Datum (1927 N.A.D.)

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
1220 S.W. MORRISON ST., SUITE 404, PORTLAND, OREGON 97205-2260 (503) 228-7688

May 24, 1989

Environmental Protection Agency
RCRA Compliance Section
1200 Sixth Avenue (HW-112)
Vancouver, Washington 98661

Attention: Mr. C. A. Shenk

Response to EPA Comments
Columbia Industrial Park Closure Plan
Vancouver, Washington

Dear Mr. Shenk,

This letter includes clarifications of the deficiencies in the Building No. 5 Closure Plan noted by the EPA in a letter dated April 10, 1989. The deficiencies will be numbered and addressed in order.

The EPA requested clarifications are as follows:

1. The maximum inventory of hazardous waste can not be determined from the available information. The available records of Cascade Temperings waste disposal practices and production process would not provide meaningful estimates of this volume.

2. A qualified waste transporter will be selected after closure plan acceptance and with consideration of availability and cost. The disposal facility will be determined based on the excavated soils designation. Non-dangerous wastes will be disposed locally at a minimum function design landfill such as the Circle C landfill. Dangerous wastes will be disposed of at a either CSSI-Arlington or ESI-Idaho.

3. Backfill procedures will be conducted to achieve the goals specified in section 1.5.7 of the Closure Plan. Imported clean fill will be placed and compacted to specifications required for use as a parking and truck loading area.

4. The area affected by excavation will be barricaded and surrounded by caution tape. The industrial parks 24 hour security service will be alerted to prevent entry to this area.

5. The topography of the affected area is essentially flat lying. Spot elevations are indicated on the attached utilities plan (Figure 1).

6. Equipment will be decontaminated in a bermed tarp covered area. The waste water will be decanted to a drum as needed and sampled prior to disposal. This will increase sample analysis and materials costs approximately $450.

7. In response to EPA concerns, a sample was collected from a depth of two feet in grid area A-5 on May 2, 1989. A total lead concentration of 1.7 ppm was determined and demonstrates that the contaminated soil has been removed. Background levels for lead in these soils range from 32 to 135 ppm as discribed in Section 1.5.2.1 of the Closure Plan. The laboratory report is attached.

8-1. In consultation with the WDOE it was decided that monitoring wells would be placed at one upgradient and three downgradient locations. The first wells (CT-2 to CT-4) were located with the concurrence of DOE representative Joanne Chance and designed to monitor the fill material. The second set of wells (AGI-1 to AGI-4) were designed to monitor the sand aquifer. Plate 11 in the AGI report demonstrates that these wells satisfy the one up- and three downgradient criterion. Additionally, this flow direction is reported as dominant at the Frontier Hard Chrome site to the north. Further discussion of the adequacy of the network will be included with clarifications of deficiencies 8-2, 8-4, 8-5, and 8-6.

8-2. The lithologic information obtained during investigation of Frontier Hard Chrome (approximately 1500 feet north of Building 5) indicates that the silty gravel unit is laterally extensive north, northeast and west of Building 5. It can be assumed to extend to the east and south as well. At Frontier Hard Chrome, this unit is described as being of relatively low permeability while an overlying silt and clay unit is considered an aquitard. At Building 5, the conditions appear similar because the silty gravel does not perch water in the overlying fill. This unit can, therefore, be considered an aquitard only in a relative sense at this site.

8-3. A utility plan for the industrial park has been reviewed. A copy of the relevant section is attached (Figure 1). Water and gas lines are present on the east and west sides of the waste disposal area respectively but do not cross this area directly. Additionally, no evidence of abandoned utilities was noted during the investigations or excavations of affected soils.

8-4. Water level measurements taken in shallow wells CT-2 and CT-3 in February 1985, July 1986 and May 1989 (Table 1) all indicate that the fill was not saturated and, therefore, should not be considered the uppermost aquifer. These measurements represent wet and dry season water levels all of which are below the described base of the fill.

8.5. There is little potential for horizontal contamination migration along the fill/silty gravel contact in that the fill is not saturated.

Infiltration and migration of contaminants will be primarily along vertical pathways. Ground water is assumed to be the primary carrier of any contaminants. Additionally, the silt content of the material may retard migration of lead by absorption.

8-6. Water levels measured in the sand aquifer at the site on May 2nd 1989 indicate water levels approximately two and a half feet higher than the July, 1986 water levels and a westward gradient. A correlation between aquifer water levels and Columbia River stage is described at Frontier Hard Chrome for this aquifer. River stage is shown to have a dominant effect on aquifer water levels and gradients. However, the predominant slope of the potentiometric surface is reported to be to the south-southeast. The average river stage is highest during May and June which indicates that gradients measured during these months may not define average flow direction and, therefore, contaminant migration direction. The primary contaminant migration direction at the site is considered to be to the south.

8-7. The total thickness of the sand aquifer at the site is not known. The alluvial material present in the flood plain of the Columbia River generally contains interbeds, lenses, and mixtures of gravel, sand, silt and clay. This material character is described near the site at Frontier Hard Chrome. Vertical groundwater flow and, therefore, vertical contaminant dispersion within the saturated zone is limited by the layered nature of this material. Additionally, a vertical ground-water gradient which would act to drive water downward was not measured at Frontier Chrome. The ground-water samples to be obtained at the site are, therefore, considered representative of this aquifer.

We expect that this information addresses the concerns of the EPA for these deficiencies. If you have any questions please contact me directly.

Yours very truly,

DAMES & MOORE

Kim L Marcus

Kim L. Marcus,
Senior Geologist

WD44/Hill
DRD:cad
17809-001-005

cc: Jack Boller, EPA